



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : A61B 17/00, B25B 23/18 F21V 33/00, A61B 1/06	A1	(11) International Publication Number: WO 90/12541 (43) International Publication Date: 1 November 1990 (01.11.90)
(21) International Application Number: PCT/SE90/00252 (22) International Filing Date: 12 April 1990 (12.04.90) (30) Priority data: 87498 14 April 1989 (14.04.89) LU (71) Applicant (for all designated States except US): PROSEPTUS PRODUCTS AB [SE/SE]; Gasverksgatan 20, S-211 29 Malmö (SE). (72) Inventor; and (75) Inventor/Applicant (for US only) : TUVESON, Jan [SE/SE]; InterLuxTool, 19, rue de Cessange, L-3347 Leudelange (LU). (74) Agents: HOLMQVIST, Lars, J., H. et al.; Lars Holmqvist Patentbyrå AB, Box 4289, S-203 14 Malmö (SE).		(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), + CH, CH (European patent), CM (OAPI patent), DE, + DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US. Published <i>With international search report.</i>
(54) Title: INSTRUMENT, TOOL OR THE LIKE, WITH BUILT-IN LIGHT DEVICE <div style="text-align: center;"> </div> (57) Abstract <p>The present invention regards an instrument, especially surgical instrument or a tool, provided with a built-in light device. The light device comprises a power source (6) enclosed in the handle (1) of the instrument, a light source (3) arranged within or adjacent the instrument at its operative section (7), and conductors (11) to connect the power source (6) with the light source (3). An instrument part (2) may constitute one conductor, while the other, or both conductors (11) is a wire surrounded by plastic or other insulating material.</p>		

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Instrument, tool or the like, with built-in light device

The present invention regards a device for illuminating the operative area of an instrument, especially a surgical appliance or a tool, by means of a light source built-in into the instrument or tool.

Today there are many different kinds of tools, instruments or the like. All of which are more or less well adopted for their intended uses. However, one problem that often arises is to get enough light and at the right spot when using different kinds of tools or instruments at dark and narrow locations. The right spot is usually the operative area of the tool or instrument.

To solve this problem light sources have been placed in the handle of the tool or instrument and the light has been aimed towards the operative area. With such a location of the light source it is at some distance from the operative area and a large part of the emitted light is often obstructed by the tool or instrument itself, the operator or something else in the vicinity of the tool or instrument. Since the light source is on quite a distance from the operative area it needs to be relatively powerful to ensure that the light that actually reaches the operative area is sufficient. Thus, the power source needs to be correspondingly powerful.

According to the present invention a small light bulb or light emitting diode is placed adjacent the operative part of the instrument or tool in order to get the illumination at exactly the desired spot when using instruments or tools. Preferably the light source is enclosed in the instrument, but may be placed in a light holder adjacent the operative part of the instrument. One of the advantages of placing the light source in the front of the instrument is that it is possible to make use of the most of the emitted light, and thereby there is less need for a powerful light source and thus the power source may be correspondingly less powerful. An other advantage is that the light always is at the operative part of the instrument.

A power source in form of batteries or the like is enclosed in the handle, which may be designed after the form of the power source used. The instrument may be used as one conductor while the other conductor surrounded by plastic or other insulating material is enclosed in the instrument or a special light holder. As an alternative both conductors may be isolated wires enclosed in the instrument or the special light holder.

As the light source is placed adjacent the operative area of the tool it may not be that big so that it in any way obstructs the normal way of using the tool. For tools that by use is rotated, such as screwdrivers, the light

source should be placed within the tool, while for cutting tools, such as scalpels, the light source may be placed on the outside of the blade adjacent the cutting edge.

The present invention is especially useful for surgical appliances that are used at army field hospitals or under other similar severe conditions. At army field hospitals it is often hard to get enough and stable power supply so anything that contributes to the illumination is positive.

Where surgical appliances are concerned the need of sterilization is to be accounted for. The sterilization is usually effectuated at 150°C for a certain period of time. For sensitive instruments the temperature may be lowered to 120°C, while prolonging the time of sterilization. The power sources have to be separated during the sterilizing operation as they can not bear these temperatures. However, the same conditions apply to the surgical appliances used at present having some kind of power source. Thus, to apply the power source after the rest of the instrument has been sterilized is no drawback, at least not compared with common practice of today.

When it comes to surgical appliances the demand of the power sources are quite moderate as the actual time the separate instruments are used is rather short in most applications, even during extensive operations.

With the present invention the handle may be reused while the rest of the instrument including the light source may be thrown away. This especially applies to surgical instruments.

The present invention is not restricted to surgical appliances and can be used for other types of tools or instruments, such as screwdrivers, knives etc. during bad light conditions.

The object of the present invention is to apply instruments, especially surgical instruments or tools, with light sources which effectively illuminate the operative section of the instruments or tools.

The object is achieved by providing an instrument according to the preamble of claim 1 with a light source in or at the instrument immediately adjacent the operative section of the instrument.

The enclosed drawings show different embodiments of the invention.

Fig. 1A is a side view of the handle and a power source according to the invention.

Fig. 1B is a side view of a screwdriver according to the invention.

Fig. 2 is a side view of a scalpel according to the invention with a special light holder.

Figs. 3, 4 and 5 are side views of further embodiments of the invention.

Fig. 6 is a sectional view taken along line VI-VI in Fig. 1B.

One embodiment of the present invention may substantially comprise a

handle 1, a tool part 2, a light source 3, a light holder 4, a cap 5, one or several batteries 6, an operative section 7 of the tool part 2, a dowel 8 for connection with a socket 10 of the handle 1, a contact 9, and one or two conductors 11 in form of isolated wires.

To get the light where it is needed a light source 3 is arranged as close as possible to the operative section 7 of the tool part 2, and thus, a substantial part of the emitted light comes to use. The light source has the form of a very small light bulb or a light emitting diode. Due to the small size of the light source it is located within the tool, or for thin instruments, such as scalpels, the light source is located in a special light holder 4 adjacent the operative section 7 of the instrument.

The power source 6 of the light device, in form of batteries or the like, is preferably located in the handle 1 of the tool or instrument. Even though the cross-section of the handle preferably is round any other suitable form corresponding to the form of the power source is possible. To facilitate replacement of the power source the handle is provided with a threaded cap 5.

To connect the handle 1 with the tool part 2 the handle 1 may be provided with a socket 10 and the tool part 2 may be provided with a corresponding dowel 8 but any other suitable connection may be utilized. Preferably the tool part 2 constitutes one conductor between the light source and the power source, while the other conductor 11 is a wire surrounded with plastic or other insulating material and enclosed in the tool. Alternatively, both conductors may be in the form of isolated wires enclosed in the tool. One or two contacts 9 at the junction between the handle 1 and the tool part 2 connects the power source 6 with the light source 3 via the conductors 11. If the tool part 2 is utilized as one conductor the dowel 8 and socket 19 constitute one contact.

As the light source 3 is placed adjacent the operative section 7 of the tool or instrument there is less demand on the emitted light compared to if the light source, as previously, is placed at a substantial distance from the operative section of the tool or instrument. Thus, the demands on the light source and power source are reduced correspondingly. The result of the location of the light source at the front of the tool or instrument is that less energy is used to get same or even better illumination of the working area of the tool or instrument.

The present invention is suitable for many kinds of tools and especially for surgical instruments. When it comes to surgical appliances one has to account for the need of sterilization. Sterilization is usually performed at 150°C for a specific amount of time, if the time is prolonged the sterilization temperature may be lowered to 120°C. The lower temperature is

intended for more sensitive instruments. The power source 6 can not bear these kinds of temperature, therefore the power source is supplied after sterilization. This is no serious drawback as it already today is common practice that some of the parts of surgical appliances may be supplied after sterilization. Different kinds of surgical appliances comprising the present invention are shown in Figs. 2 to 5.

Fig. 2 shows a scalpel embodying the present invention, where the light source 3 is arranged in a special light holder 4 adjacent the scalpel blade. This arrangement is intended for applications where the instrument or tool is not wide enough to enclose the light source.

In the scissors shown in Fig. 3 the light source 3 according to the present invention is arranged at the pivot of the scissors.

Fig. 4 shows one type of an endoscope, where the light source 3 is placed adjacent a mirror 7, which is the operative section of this instrument.

The instrument part shown in Fig. 5 is a probe and the light source 3 is enclosed in the instrument.

For surgical work under severe conditions such as at army field hospitals the present invention is especially useful. While the handle 1 including the power source 6 may be reused one may throw away the other part of the instrument including the light source 3. The part of the instrument that is to be sterilized is sealed after sterilization and, thus, may be stored and supplied separately. By connecting a sterilized instrument part 2 with the handle 1 enclosing the power source the instrument is ready for use.

As during even an extensive operation the single instruments are used only for a short period of time, the demand on the power source 6 is relatively low. However, if using larger power sources, the same handle may be used for several different instruments or during a longer period of time.

CLAIMS

1. An instrument, especially surgical instrument or tool, comprising a light source (3), a power source (6) and conductors therebetween, characterized in that said light source (3) is arranged in or at the instrument (2) immediately adjacent the operative section (7) of the instrument.

2. An instrument according to claim 1, characterized in that the power source (6) is arranged inside the handle (1) of the instrument, and that the handle (1) is separable from the rest of the instrument.

3. An instrument according to claim 1 or 2, characterized in that the light source is a small light bulb.

4. An instrument according to claim 1 or 2, characterized in that the light source is a light emitting diode.

5. An instrument according to anyone of the previous claims, characterized in that the instrument constitutes one conductor.

6. An instrument according to anyone of claims 1-4, characterized in that either one or both conductors (11) are wires surrounded by plastic or other insulating material and enclosed in the instrument, or a light holder (4) adjacent the operative section of the instrument.

7. An instrument according to claim 2, characterized in that contacts (9) to connect the light source with the power source are arranged at the junction between the handle and the rest of the instrument.

8. An instrument according to anyone of the previous claims, characterized in that the light source, the conductors and the contacts can bear a sterilization at 150°C.

9. An instrument according to anyone of the previous claims, characterized in that it is a screwdriver.

10. An instrument according to anyone of claims 1 to 8, characterized in that it is a surgical instrument.

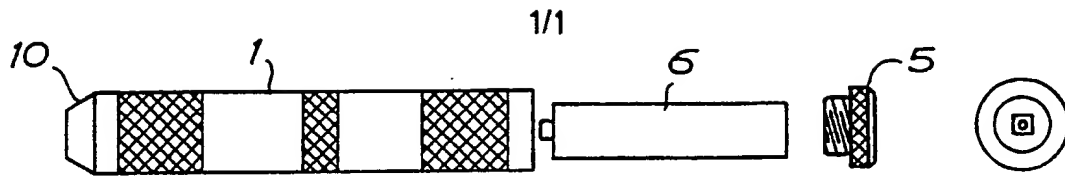


FIG. 1A

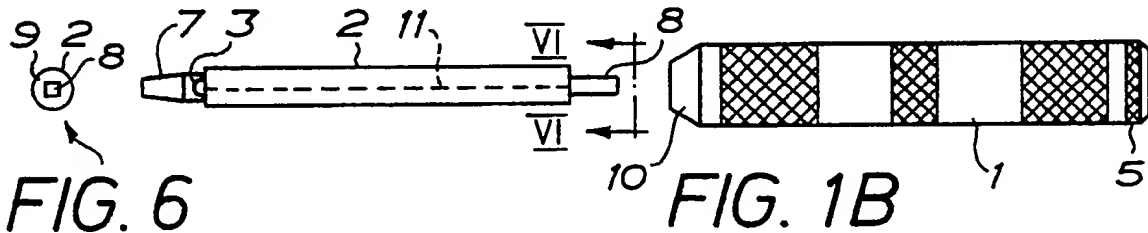


FIG. 1B

FIG. 6

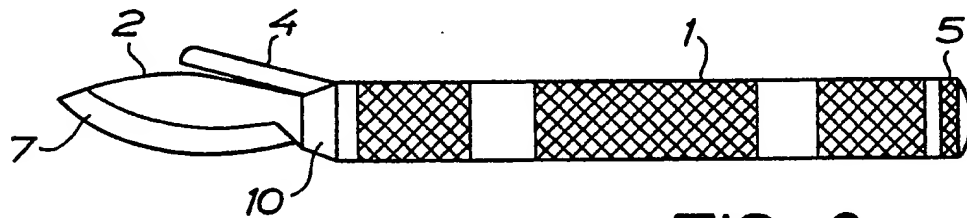


FIG. 2

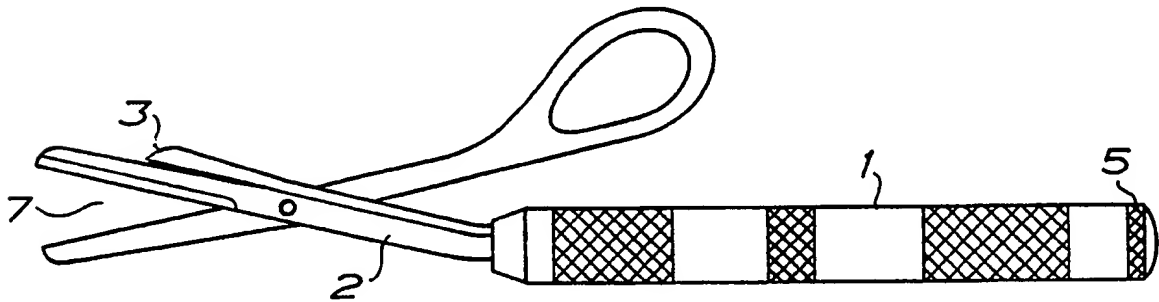


FIG. 3

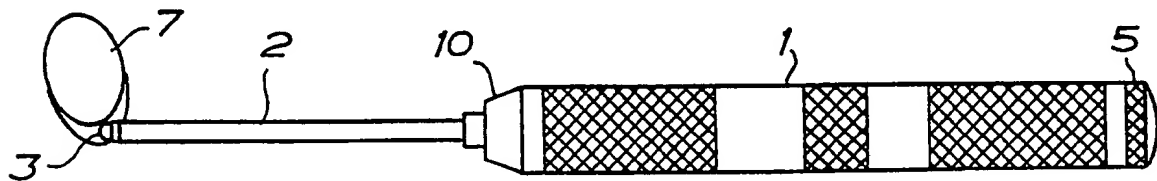


FIG. 4

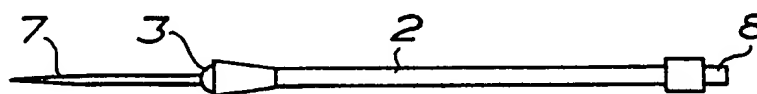


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 90/00252

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 61 B 17/00, B 25 B 23/18, F 21 V 33/00, A 61 B 1/06		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC5	A 61 B; B 25 B; F 21 V	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸		
SE,DK,FI,NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, A, 1165232 (H.L. DE ZENG) 21 December 1915, see the whole document --	1-10
X	DE, A1, 2706452 (JANSEN, ROLF) 24 August 1978, see the whole document --	1-10
X	US, A, 3349764 (L.L. EDINGER ET AL) 31 October 1967, see the whole document --	1-10
A	GB, A, 2053438 (TWEezer-LITE INC.) 4 February 1981, see abstract; figure 1 --	9
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IV. CERTIFICATION		
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Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	EP, A1, 0306461 (TUVESON, JAN LENNART) 8 March 1989, see abstract; figures 1-3 -- -----	1-10

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 90/00252**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 1165232	15-12-21	NONE	
DE-A1- 2706452	78-08-24	NONE	
US-A- 3349764	67-10-31	NONE	
GB-A- 2053438	81-02-04	US-A- 4283757	81-08-11
EP-A1- 0306461	89-03-08	AU-D- 3198989	89-09-22
		WO-A- 89/08013	89-09-08